

```

PDEParabExpl := proc (n, m, k, a, b, g, e, f, alfa1, beta1, alfa2, beta2, gama1, gama2, phi)
  local h, n1, m1, u, i, j, alfa, beta, x, F, d1, d2, d3;
  with(linalg);
  h := (b-a)/n;
  n1 := n + 1;
  m1 := m + 1;
  alfa := evalf(k/(h*h));
  beta := evalf(k/(2*h));
  x := Vector(n1, i → a + (i-1)*h);
  u := Matrix((m1, n1), 0);
  d1 := Vector(n1, 0);
  d2 := Vector(n1, 0);
  d3 := Vector(n1, 0);
  F := Vector(n1, 0);
  #profil u - 0 vrstva
  print(`alfa=`, alfa);
  for i to n1 do u[1, i] := evalf(phi(x[i])) end do;
  #Výpo et diagonál v matici A a pravé strany, u(j+1)=F(j)+A*u(j)
  for j to m do
    for i from 1 to n1 do
      d1[i] := evalf(g(x[i], (j-1)*k)*alfa-e(x[i], (j-1)*k)*beta);
      d2[i] := evalf(1-2*alfa*g(x[i], (j-1)*k));
      d3[i] := evalf(g(x[i], (j-1)*k)*alfa + e(x[i], (j-1)*k)*beta);
      F[i] := evalf(k*f(x[i], (j-1)*k, u[j, i]))
    end do;
    # Výpo et profilu u - j+1 vrstva, tj. pro t=j*k
    for i from 2 to n do
      u[j+1, i] := evalf(F[i] + d1[i]*u[j, i-1] + d3[i]*u[j, i+1] + d2[i]*u[j, i])
    end do;
    # výpo et okrajových podmínek - j+1 vrstva, tj. pro t=j*k
    u[j+1, 1] := (gama1(j*k)-beta1(j*k)/(2*h)(4*u[j+1, 2]-u[j+1, 3]))
    / (alfa1-3*beta1(j*k)/(2*h));
    u[j+1, n1] := (gama2(j*k) + beta2(j*k)/(2*h)(4*u[j+1, n]-u[j+1, n-1]))
    / (alfa2 + 3*beta2(j*k)/(2*h))
  end do;
  RETURN(eval(u));
end proc;

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▼ P íklad 1:

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phi := x → sin(evalf(Pi*x)) :
alfa1 := 1 :
beta1 := t → 0 :
alfa2 := 1 :
beta2 := t → 0 :
gama1 := t → 0 :
gama2 := t → 0 :
g := (x, t) → 1 :
e := (x, t) → 0 :
f := (x, t, y) → 0 :
n := 10 :
m := 100 :

```

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k := 0.005 :
h :=  $\frac{1.0}{n}$  :
T := k·m :
vys := PDEParabExpl(n, m, k, 0.0, 1.0, g, e, f, alfa1, beta1, alfa2, beta2, gama1, gama2, phi) :
      alfa=, 0.5000000000 (1.1)

```

```

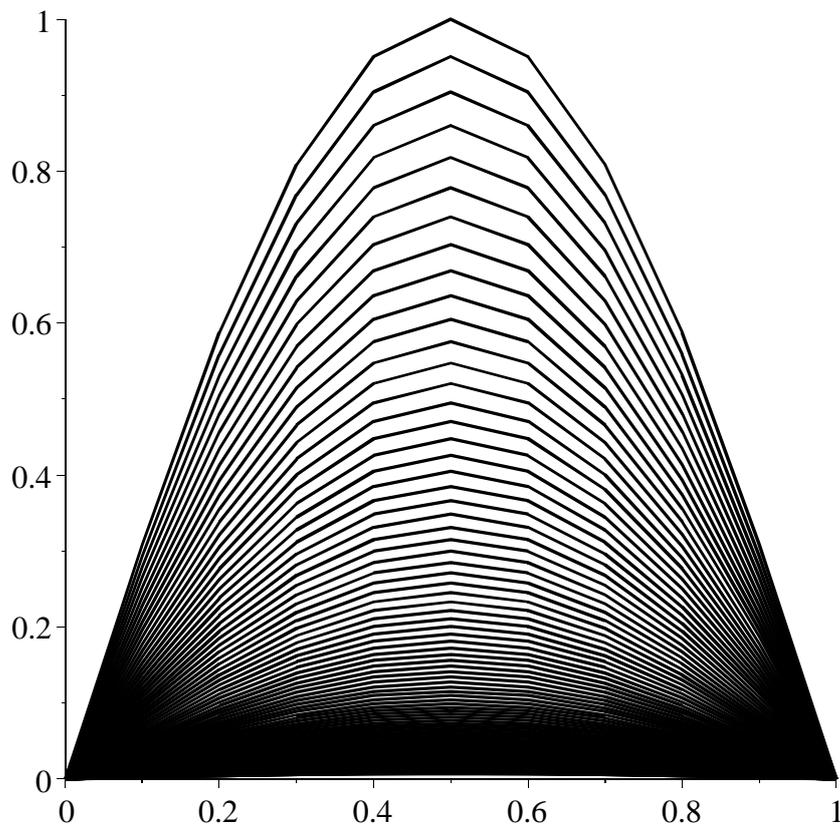
data := [seq([seq([0 + (i - 1)·h, vys[j, i]], i = 1 .. n + 1)], j = 1 .. m + 1)]:
with(plots) :

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display(seq(listplot(data[i]), i = 1 .. m));

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a := subs(1 .. m + 1 = 0 .. T, 1 .. n + 1 = 0 .. 1, matrixplot(vys[1 .. m + 1, 1 .. n + 1], labels = [t,
x, u])) :
display(a, view = [0 .. T, 0 .. 1, 0 .. 1]);

```

